ABSTRACT

Methods and apparatuses for obtaining position and energy information without pileup. Signal integration, which is triggered by a present event, stops when a subsequent event is detected. A weighted value for estimating the total energy in a scintillation is calculated, which includes the energy of the current event and a residual energy from previous events. Remnant correction is used to calculate a pile-up free energy from two consecutive weighted values. An analog filter may be applied to reduce noise. Dynamic digital weighting of integrated values, and/or digital integration may be used during data processing. Pileup can be avoided in conjunction with several types of applications, including multi-zone detector applications and coincidence detection applications. High-resolution timing techniques are also disclosed that facilitate one's ability to avoid pileup.

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